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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,846	11/04/2003	Motoki Kakui	50395-236	4038

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EXAMINER

HUGHES, DEANDRA M

ART UNIT	PAPER NUMBER
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3663

DATE MAILED: 08/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/699,846		KAKUI, MOTOKI	
	Examiner		Art Unit	
	Deandra M. Hughes		3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-11 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. Applicant's arguments stating that the amendments to the specification do not constitute new matter in that the amendments merely correct clerical and/or translational oversights are convincing (see pgs. 8-9 of Applicant's remarks dated 6/26/06). Accordingly, the amendments to the specification (dated 6/26/06) have been entered.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-4, 6-8, and 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Bolshtyansky et al. (US 6,456,426 published Sept. 24, 2002).

**The references made herein are done so for the convenience of the applicant. The prior art should be considered in its entirety.

With regard to claims 1, 4, and 8, Bolshtyansky discloses a Raman amplification pump module (fig. 3; col. 5, lines 30-40) *for outputting pump light for Raman-amplification of signal light propagating through an optical waveguide path*, said module comprising:

- a light source system (#48) *for emitting light having two or more different output peak wavelengths (λ_1 - λ_4)*;
- and a nonlinear medium (as is disclosed in instant applicant's specification paragraph [0040]; nonlinear medium can be an optical fiber; #52) having

an input port (connected to #50) and an output port (other end of fiber #52), said nonlinear medium *affording nonlinear effect* (all optical fibers inherently impart non-linear effects) *on light emitted from said light source system and input from the input port, and outputting the resultant light as pump light from the output port* (fig. 3 is a pump module).

With regard to claim 10, Bolshtyansky discloses a broadband light source having an input port (connected to #50) and output port (other end of fiber #52) comprising:

- a light source system (#48) and a nonlinear medium (#52), wherein said light source system emits light having two or more different output peak wavelengths (λ_1 - λ_4);
- and said nonlinear medium *affords nonlinear effect on light input into the input port from said light source system* (all optical fibers inherently impart non-linear effects), and *outputs the resultant light as pump light from the output port* (fig. 3 is a pump module).

With regard to claim 11, Bolshtyansky discloses a Raman amplifier for amplifying signal light propagating through an optical fiber, said amplifier comprising:

- an optical fiber for Raman amplification (fig. 2, #16), a multiplexing module (fig. 2, #34), and a Raman amplification pump module (fig. 3), said Raman amplification pump module comprising:
 - o a light source system (#48) *for emitting light having two or more different output peak wavelengths* (λ_1 - λ_4);

- and a nonlinear medium (#52) having an input port (connected to #50) and an output port (other end of fiber #52), *said nonlinear medium affording nonlinear effect (all optical fibers inherently impart non-linear effects) on light emitted from said light source system and input from the input port, and outputting the resultant light as the pump light from the output port (fig. 3 is a pump module).*

With regard to claim 2, a high output power laser is disclosed (col. 6, lines 60-65) and the multiplexers are fig. 3, #50. Further, the phrase “*capable of causing optical parametric effect*” is a functional limitation. See below.

With regard to claim 3, the lasers do not have temperature-adjusting means.

With regard to claims 6-7, the wavelength spacing is more than 2nm (col. 6, lines 3-40). Further, the Examiner considers the language directed towards the discretionary selection of the output wavelengths to be function language. See below.

The Examiner considers the claim language identified in italics above to be a functional limitation, i.e. intended use. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function alone. Since the structural limitations have been met by the prior art, the Examiner has reason to believe that the function limitation can be performed by the prior art structure. See MPEP 2114.

Claim Rejections - 35 USC § 103

4. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bolshtyansky et al. (US 6,456,426 published Sept. 24, 2002) in view of Tsuzaki

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(Broadband Discrete Fiber Raman Amplifier with High Differential Gain Operating Over 1.65 μ m-band, 2000).

Bolshtyansky does not specifically disclose the claimed figure of merit (FOM). However, Tsuzaki teaches that a Raman amplifier with a highly-nonlinear-fiber (HNLF) with a FOM 13.2 W⁻¹dB⁻¹ (pg. MA3-2, line 16). It would have been obvious to one of ordinary skill (e.g., an optical engineer) in the art at the time the invention was made to apply the HNLF of Tsuzaki to the device of Boltshyansky for the advantage of a high-gain, low-noise Raman amplifier, as is specifically taught by Tsuzaki.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 9 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In particular, Applicant claims $\gamma/\alpha > 13 \text{ W}^{-1}\text{dB}^{-1}$. However, $\gamma/\alpha > 14 \text{ W}^{-1}\text{dB}^{-1}$ has not been enabled. Applicant clearly has not enabled all figures greater than 13 W⁻¹dB⁻¹. To overcome this rejection, applicant must claim the upper-limit of this range.

8. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In particular, the claim is indefinite because the claimed range lacks an upper-limit.

Response to Arguments

9. With regard to claim 5, Applicant's arguments have been considered and are persuasive (see pg. 12 of Remarks filed 6/26/06. Accordingly, the 103(a) of claim 5 has been withdrawn.

10. With regard to claim 9, Applicant's amendments necessitated a new grounds of rejection. Consequently, the arguments are moot.

11. With regard claims 1-4 and 6-11, Applicant's argument in pages 9-11 filed 6/26/06 have been fully considered but they are not persuasive.

Applicant argues that Bolshtyansky does not disclose a non-linear medium. The Examiner has previously responded to this argument in Section 5 of the Final Office Action dated 3/29/06. All fibers are inherently non-linear mediums. This is well-known in the art, as is clearly supported by the following:

- (A) Agrawal, which is an art-specific book entitled Fiber-Optic Communication Systems, clearly states that optical fibers are non-linear mediums. Again, Applicant is directed to Agrawal, pg. 59, lines 1-2, under the section entitled *Non-Linear Optical Effects*.

- (B) Again, applicant specifically states in paragraph [0040] “non linear mediums may be an optical fiber” (emphasis mine). Boltshytansky discloses an optical fiber. Therefore, Boltshytansky discloses a non-linear medium.

Allowable Subject Matter

12. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ho et al., Bragheri, Dai, and Uesaka disclose Raman amplifiers with HNLFs.


14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deandra M. Hughes whose telephone number is 571-272-6982. The examiner can normally be reached on M-F, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Deandra M Hughes
Primary Examiner
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